

REMARKS/ARGUMENT

Regarding the Claims in General:

Claims 1-22 remain pending. Claims 1 and 22 have been amended to better highlight distinguishing features of the invention. It is believed from the Examiner's Response to Arguments that she recognizes the significance of these distinctions, but that she does not believe that these features were expressly recited.

Regarding the Prior Art Rejections:

The Examiner is respectfully requested to reconsider and withdraw the rejection of claims 1, 2, 4-9, 14, 18-20, and 22 as anticipated by US Patent 4,301,958 (Hatakenaka). Claims 1 and 22, have been amended to emphasize that the bond heads and the work holders are assembled into a single integrated structure; and which cooperate with a controller which is programmable to operate each bond-head of the integrated apparatus independently to perform bonding of wires between a semiconductor chip and a leadframe simultaneously with the other bond-heads but without synchronization of movement between the bond-heads.

Hatakenaka describes an in-line assembly system having a plurality of separate wire-bonders 5a, 5b, 5c, each having only a single bond-head. The patent notes at Col. 5, lines 37-46 that several wire bonders are required for a single die bonder 3 because the operating speed of the die bonder is greater than that of the wire bonder. Each of the wire bonders therefore serves both a lead attaching function, and also to convey unbonded lead frames downstream to the next wire bonder. Accordingly, the bond heads and the work holders are not assembled into a single integrated structure, as now called for in claims 1 and 22.

Further, there is no controller in Hatakenaka that operates multiple bond-heads of a single bonding machine independently of each other, as also now explicitly recited in claims 1 and 22.

The Examiner is also respectfully requested to reconsider and withdraw the rejection of claims 1-9 and 14 as anticipated by JP 05218124E (Nomura). Similar to Hatakenaka, Nomura discloses a plurality of wire bonding units C1-C3 in an assembly line, wherein each unit has a single bond-head 202 (see for example, Figs. 3-5). Nomura therefore does not anticipate claims 1 and 22, which recite that the bond heads and the work holders are assembled into a single integrated structure.

The Examiner is respectfully requested to reconsider and withdraw the rejection of claims 10-13 as obvious over Nomura in view of US Patent 6,108,204 (Brotherton). These claims are dependent on claim 1, and are patentable over Nomura for the reasons stated above.

Brotherton does not remedy the deficiencies in Nomura, as it is directed only to a cooling system for specific processors (a PENTIUM or PENTIUM PRO) mounted on a specific type of motherboard (a baby AT motherboard) to allow accommodation of other expansion boards. Combining these references does not produce a bonding machine in the form of an integrated structure including multiple bond heads and work holders, or one with a controller for independently operating all of the bond heads.

Likewise, claims 15 and 16 are patentable over the combined teachings of Nomura and US Patent 4,821,844 (Tsumura). Nomura does not anticipate claim 1 as amended for the reasons stated above. Tsumura only discloses a wire bonding method and types of wires useable with this method, and therefore does not remedy the deficiencies of Nomura. There is no teaching or suggestion in the combined teachings of Nomura and Tsumura for bonding of different types of wires or wires with different diameters simultaneously, and/or on a single wire-bonding apparatus having multiple, independently controlled bond heads.

Claims 16 and 17 are also patentable over the combined teachings of Nomura in view of US Patent 5,839,640 (Kinnaid), which does not remedy the deficiencies in Nomura mentioned above. Kinnaid is directed to solution to an entirely different problem, namely, that of capillaries bonding over only a limited angle. Thus, there is a need to have two capillaries on the same machine with different capillary orientation (see Col 1, lines 14-18). Moreover, there is no mention of using the different capillaries to conduct bonding of wires of different diameters simultaneously (Kinnaid appears to be directed to bonding with the same wire, albeit using different capillary orientations), as recited in claim 16, nor any suggestion of bonding using different patterns simultaneously, as recited in claim 17.

Finally, claims 15-17 are patentable over the combined teachings of Hatakenaka and Carlomagno (US Patent 5,189,507). Carlomagno does not remedy the deficiencies in Hatakenaka, since it only discloses that bonding wires can have different diameters, and bonding wires can be employed to form different patterns. However, Carlomagno does not disclose the making of bonds with different diameters or different patterns simultaneously as called for in claims 15-17.

Regarding Other References Cited by the Examiner

The other references cited by the Examiner but not applied have been considered, but the present claims are not believed to be anticipated or rendered obvious by these references.

In view of the foregoing, favorable reconsideration and allowance of this application are respectfully solicited.

I hereby certify that this correspondence is being transmitted by Facsimile (703) 872-9311 and (703) 305-7115 addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on September 11, 2003

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Respectfully submitted,

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